



# A STUDY OF LINEAR MEASUREMENTS OF DISTRICT CHAMPION BOYS ATHLETE OF WEST BENGAL

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## ABSTRACT

The subjects of the present study were 60 district champion boys athlete of sixteen district of West Bengal. Their age ranged between 9 to 11 years. The number of subjects in Group - A (9 years) was 20, in Group - B (10 years) was 22 and in Group - C (11 years) was 18. The purpose of the study was to analyse and compare the age wise differences, in selected anthropometric and body composition among 9 years, 10 years and 11 years boys athletes. It appears that the 11 years old boys had significantly higher body weight than 9 years and 10 years respectively. So, far height is concerned, no significant difference was found between 9 years and 10 years of district champion boys' athlete.

**KEY WORDS:** Anthropometric Measurements, Physical Fitness

## 1. INTRODUCTION

Physical activity is a need and inherent characteristics of a developing child. Physical activity and childhood seem such natural partners that it requires no theoretical explanation to establish it. Various features of our late 20<sup>th</sup> century civilization – internet, video games, television, spectator sports, auto-mobile, labor-saving gadgets and urban overcrowding have conspired to create a generation of inactive children.

The children of 3rd World countries particularly of low socio-economic families are facing some other problems i.e., malnutrition, improper diet and poor living condition etc. These perhaps stunted the growth of the physique of younger children during their developing stage. If the size and shape of the body is restricted by extraneous factors and not for genetic endowment then it is a matter of concern for the society and government agencies. Therefore, proper development and growth of physique is important and utmost care should be taken in this regard for total development of children.

Physique means to the shape, the size and the form of an individual. Physique has three different yet interrelated aspects to the body size, body composition and body structure. Body size refers to the physical magnitude of the body volume, mass, length and surface area. Body composition refers to the amount of constituents in the body like fat, muscle, water and ash content. Body structure, the third aspect of physique, refers to the distribution or arrangements of body parts e.g. skeleton and muscle fat distribution over the body.

The question is frequently raised, "What do you do with such measures?" The most widely used measures of size are height and body weight. It is indeed true growth does not constitute a valid criterion upon which a student is graded. Nelson and Cozen (1937) proposed a practical classification system in children based on size e.g. age, weight and height whereby differences in physical capacities could be equalized. The influence of body size on physical performance has been theoretically examined by Asmussen and Heeboll Nelson (1955) using a dimensional analysis based upon the quantities of length, mass and time.

It was assumed that the body composition remain unchanged, so that the densities of body tissue are unaltered. The assumption does not apply to certain age groups in which growth is rapid and particularly when maturation is taking place. In evaluating the body in relation to its structure and nutritional status, health and physical educators are generally limited to external measures of body bulk, linearity and skinfold thickness. These measures do not permit an adequate differentiation between lean and fat body tissue. Lean tissue includes all tissues exclusive of fat is muscles, bones, organs, fluids etc. Fat includes essential as well stores fat. The essential fat is about 3% of the total body weight in case of male and 12% in case of female. Storage fat is found in adipose tissue. Adipose tissue is found subcutaneously and around organs, where it acts as a buffer against physical trauma. It is desirable to reduce storage fat for health and aesthetic reason.

## 2. PURPOSE OF THE STUDY

- To highlight specific information to classify students according to Anthropometry.
- To analyse and compare the age wise differences, in selected Linear Measurements among 9 years, 10 years and 11 years boys athlete.

## 3. METHODOLOGY

### 3.1 Subject

The subject of the present study were 60 (sixty) preadolescent school going district level boys athlete aged from 9 years through 11 years. Since this is an important criterion for this study, school record regarding age was considered and on the basis of that subjects were selected and assigned to respective age groups. The boys selected for the study were habitants of sixteen (16) districts of West Bengal State, India. About 90% of the students in each group were from rural area and remaining were from urban & semi urban locality. The socio-economic condition of the subjects was more or less same but variation of daily routine and cultural activity were due to regional peculiarities. The food habits, habitual physical and leisure time activity and some other minute details could not be controlled and was beyond the scope of the study. However, there was not much variation in general health, which was within normal range.

### 3.2 Selection of Variables

The Following Anthropometric Variables were selected:

Anthropometric Variables	Name of the variables	Measurements Units
Linear Measurements	- Weight	Kilogram (Kg.)
	- Height	Centimetre (cm.)
	- Sitting Height	- Do-
	- Leg Length	- Do-
	- Arm Length	- Do-

## 4. STATISTICAL PROCEDURE

For statistical analysis, the mean, Standard Deviation, ANOVA and Paired Mean Differences were used.

## 5. RESULTS AND DISCUSSIONS

Table – I  
Mean, SD and Range of Linear Measurements of Three Groups

Variable	9 Years Old Boys (G-A)N=20			10 Years Old Boys (G-B)N=22			11 Years Old Boys (G-C)N=18		
	Mean	S.D.	Range	Mean	S.D.	Range	Mean	S.D.	Range
Wt (kg.)	24.05	2.84	20-30	26.068	4.83	20-34	29.722	4.897	22-38
Ht (cm.)	129.65	6.29	122-142	134.32	9.81	120-155	139.94	9.896	122-154
SH (c.m.)	64.4	3.39	60-72	66.636	3.58	59-76	69.389	3.928	63-77
LL (c.m.)	65.25	4.69	55-76	67.68	7.44	58-76	70.56	7.72	58-73
AL (c.m.)	55.2	4.06	50-60	60.136	4.65	54-67	62.0	3.985	53-67

Wt- Weight, Ht-Height, SH-Sitting Ht., LL-Leg Length, AL-Arm Length

Mean body weight of the group 'A' (9 years) was 24.05 kg., 'B' (10 years) was 26.07 kg., which is higher than group 'A' (9 years), and group 'C' (11 years) was 29.72 kg. It also appears from the table - 4.1 that the weight range was higher in group C (11 years).

The mean height of Gr. A was 129.65 cm. for Gr. B it was 134.32 cm and Gr. C the mean height was 139.94 cm. The height range was comparatively higher in GB (10 years) between 120 and 155 cm.

Mean value of sitting height of the Gr.C was 69.389 cm., Gr. B 66.636 cm. and Gr. A 64.4 cm., Mean of GC was higher than the mean of Gr. B and Gr. A. It appears from the table that the maximum range of sitting height was in Gr. C

It has observed that the mean value of leg length of Gr. C (70.56 cm). was higher than that of other two age groups Gr. A (65.25 cm.) and Gr. B (67.68 cm). Gr. B recorded higher mean value than Gr. A.

The mean scores of Arm Length of Gr. A was 55.2 cm., for Gr. B 60.136 cm. and for Gr. C it was 62 cm.

**Table – II**  
**Analysis of Variance Among the Three Means of the Linear Measurements**

Variable	SV	SS	df	F- Ratio	Significance (0.05) Reqd. Table value 3.18
Wt.	Between Group	311.037	2		
	Within Group	1036.96	57	8.548582	Significant
Ht.	Between Group	1004.583	2		
	Within Group	4440.267	57	6.447948	Significant
S H	Between Group	236.0146	2		
	Within Group	750.1687	57	8.966539	Significant
L L	Between Group	166.898	2		
	Within Group	1319.285	57	3.605431	Significant
A L	Between Group	479.0591	2		
	Within Group	1036.791	57	13.16869	Significant

It appeared in the table - II that the obtained 'F' - value from the computation of ANOVA in the body weight was highly significant. The obtained 'F' - value 8.55 was higher than the table value 5.06 at the 0.05 level at 57 df. The three means of three groups were significantly different. Therefore, it is necessary to find the paired means that were responsible for 'F' - value to be significant presented in the table III.

In case of Height, the calculated 'F' value was found to be 6.4479 against the tabulated value of 5.06 at the 0.05 level of significance for 57 df.

In Sitting Height computed 'F' - value was found as 8.9665 which was much higher than the table value of 'F' - 5.06 at 0.05 level of significance at 57df.

The obtained 'F' - value in leg length was found 3.61 which was statistically significant against the table value of 'F' - 5.06 at 57df.

The obtained 'F' - value for Arm Length was 13.17 which is found to be significant at 0.05 level of confidence.

**Table – III**  
**Comparison of Paired Means of the Linear Measurements**

Variable	G-A vs G-B			G-A vs G-C			G-B vs G-C		
	DM	df	t-value	DM	df	t-value	DM	df	t-value
Wt.	2.0182	40	1.629	5.67	36	4.424*	3.65	38	2.366*
Ht.	4.668	40	1.814	10.29	36	3.866*	5.626	38	1.797
S H	2.236	40	2.075*	4.989	36	4.201*	2.753	38	2.316*
L L	2.63	40	1.252	5.31	36	2.589*	2.88	38	1.19
A L	4.936	40	3.647*	6.8	36	5.20*	1.864	38	1.343

\* Significant at 0.05 level (df=40)=2.02

\* Significant at 0.05 level (df=36 & 38)=2.03

It appears from the table - III that the mean difference between Gr. A and Gr. B in respect of body weight calculated 't' value 1.629 was less than the table value of 't' was 2.02 at 0.05 level of significance and it was not found to be significant. The mean difference between group Gr. A and group Gr. C the calculated 't' was 4.424 was highly significant. Similarly, the difference between Gr. B and Gr. C obtained 't' - value was 2.366 and this was also found to be significant.

The height of Gr. B was not found significantly different from that of Gr. A, On the other hand while comparing the height of Gr. C and Gr. A, significant differences have been obtained (3.86).

Significant differences Sitting Height have been found while comparing between Gr. A vs Gr. B, Gr. A vs Gr. C and Gr. B vs Gr. C.

Leg Length of Gr. A was significantly different from that of Gr. C. The t value obtained is 2.589 was found to be significant at 0.05 level of confidence. Sig-

nificant differences have not been found while comparing between Gr. A vs Gr. B, and Gr. B vs Gr. C.

## CONCLUSIONS:

Eleven years old (Gr.C) district champion Bengali boys athlete had shown significantly higher in body weight, standing height, sitting height, leg length, and arm length than that of Gr. A and Gr. B respectively.

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